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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/541,774	07/07/2005	Pierre Barberis	12928/10025	1671

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EXAMINER	
SHEVIN, MARK L	
ART UNIT	PAPER NUMBER
4116	
MAIL DATE	DELIVERY MODE
11/14/2007	PAPER

Please find below and/or attached an Office communication concerning this application or proceeding.

The time period for reply, if any, is set in the attached communication.

Office Action Summary	Application No.	Applicant(s)	
	10/541,774	BARBERIS ET AL.	
	Examiner	Art Unit	
	Mark L. Shevin	4116	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE *3* MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

1)☒ Responsive to communication(s) filed on *07 July 2005*.

2a)☐ This action is **FINAL**. 2b)☒ This action is non-final.

3)☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

4)☒ Claim(s) *11-20* is/are pending in the application.

4a) Of the above claim(s) _____ is/are withdrawn from consideration.

5)☐ Claim(s) _____ is/are allowed.

6)☒ Claim(s) *11-20* is/are rejected.

7)☐ Claim(s) _____ is/are objected to.

8)☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

9)☐ The specification is objected to by the Examiner.

10)☒ The drawing(s) filed on *07 July 2005* is/are: a)☒ accepted or b)☐ objected to by the Examiner.

Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).

Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).

11)☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

12)☒ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).

a)☒ All b)☐ Some * c)☐ None of:

1.☒ Certified copies of the priority documents have been received.

2.☐ Certified copies of the priority documents have been received in Application No. _____.

3.☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

1) ☒ Notice of References Cited (PTO-892)
2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
3) ☒ Information Disclosure Statement(s) (PTO/SB/08) Paper No(s)/Mail Date *07 July 2005*.
4) ☐ Interview Summary (PTO-413) Paper No(s)/Mail Date. _____ .
5) ☐ Notice of Informal Patent Application
6) ☐ Other: _____.

DETAILED ACTION

Status

1. Claims 1-10 are cancelled per Applicant's preliminary amendment filed 07/07/2005. Claims 11-20, filed 07/07/2005 are pending.

Claim Rejections - 35 USC § 103

2. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

> (a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negatived by the manner in which the invention was made.

3. The factual inquiries set forth in *Graham* **v.** *John Deere Co.*, 383 U.S. 1, 148 USPQ 459 (1966), that are applied for establishing a background for determining obviousness under 35 U.S.C. 103(a) are summarized as follows:

1. Determining the scope and contents of the prior art.
2. Ascertaining the differences between the prior art and the claims at issue.
3. Resolving the level of ordinary skill in the pertinent art.
4. Considering objective evidence present in the application indicating obviousness or nonobviousness.

1. **Claims 11-16, 18-20** are rejected under 35 U.S.C. 103(a) as being unpatentable over **Charquet** (US 5,674,330).

Regarding claims 11 and 16, Charquet discloses (column 4, lines 55-60) the production of an ingot by casting a Zr alloy containing at least 97% of Zr, then forging the same at a temperature between 700 and 1100 C, i.e. a temperature at which said Zr alloy can be in a state comprising crystalline phases alpha and beta of said Zr alloy, in order to produce a prefabricated product (a blank or semi-finished product) having a

thickness of 100 mm. Charquet teaches a subsequent hot rolling process (a form of forging) in the alpha range, at 630 – 670 C (column 4, lines 65-67) **[claim 16]**.

Charquet does not teach the specific size of the cast ingot, yet it would have been particularly obvious to one of ordinary skill to select dimensions of the ingot through routine optimization. Where the only differences between the prior art and the instant claims are relative dimensions and the article having the claimed relative dimensions would not performed differently than the prior art device, the claimed article is not patentably distinct from the prior art article.

The claimed invention, taken as a whole, would have been obvious to one of ordinary skill in the metallurgical arts at the time the invention was made in view of the teachings of Charquet.

Regarding claims 12-15, the amount of alpha phase present in the billet during forging can be easily optimized through routine optimization and by consulting a phase diagram that is well known to metallurgists. The temperature range at which a given zirconium alloy will contain both the alpha and beta phase will vary depending on the alloy composition, and the temperature range can be selected by routine optimization depending on the alloy used.

Regarding claim 18, one of ordinary skill in the metallurgical arts would have a reasonable expectation of success in carrying out the claimed process with a more heavily alloyed zirconium ingot as this would not affect the claimed aspects of the ingot production and forging steps. Neither the alloy nor the broad process would be effected -- e.g. if a beta phase stabilizer were added, then the forging temperature could be

changed, as long as it is took place in the alpha+beta phase field. Furthermore, Charquet teaches that his process relates to the production of a flat product (sheet) using a zirconium alloy with 0.5 – 2.0% Sn and with possible supplementary additions of niobium and vanadium. From these additional, one can surely envision the process being carried out on an alloy with more than 3% of additive elements.

Regarding claims 19-20, further specifying intended use does not patentably distinguish these claims over the teachings of Charquet. Charquet teaches that Zircaloy is specifically used for the production of fuel element casings **[claim 20]** for boiling water reactors **[claim 19]**.

4. **Claims 11-16, 18-20** are rejected under 35 U.S.C. 103(a) as being unpatentable over **Sabol** (EP 0.085.553).

Regarding claims 11 and 16, Sabol, in his background section, teaches that nuclear grade Zircaloy (Zr-Sn) alloy products are made by producing an ingot (ingots are, by definition, cast [Oxford English Dictionary: "A mass of cast metal…]) having a diameter between 16 and 25 inches, which corresponds to approximately 406 and 635 mm respectively. The ingot is then heated into the beta, *alpha+beta*, or high temperature alpha phase and then worked to some intermediate sized and shaped billet (page 2, lines 4-19). This working step may be performed by forging (page 2, line 11).

Sabol further teaches that depending on the size and shape of the intermediate product (after first forging step), the billet may be alpha worked and then forged to a size and shape appropriate for extrusion (page 2, lines 25-29) **[Claim 16]**.

Overall, Sabol teaches that after a first step of producing an ingot, and then forging this ingot to produce a semi-finished product (intermediate billet, page 2, line 14). Sabol envisages the option of having a single forging step (page 2, lines 12-19; page 4, lines 6-13). However, Sabol does not teach the specific claim limitations involving the length of the ingot, however one of ordinary skill could attained the claimed size limitations through routine optimization. Furthermore, there are repeated references to later operations as being adjustable or tailored to the size and shape of the ingot billet (page 2, lines 29-35).

The claimed invention, taken as a whole, would have been obvious to one of ordinary skill in the metallurgical arts at the time the invention was made given the teachings of Sabol.

Regarding claims 12-15, the amount of alpha phase present in the billet during forging can be easily optimized through routine optimization and by consulting a phase diagram that is well known to metallurgists. The temperature range at which a given zirconium alloy will contain both the alpha and beta phase will vary depending on the alloy composition, and the temperature range can be select by routine optimization depending on the alloy used.

Regarding claim 18, one of ordinary skill in the metallurgical arts would have a reasonable expectation of success in carrying out the claimed process with a more heavily alloyed zirconium ingot as this would not affect the claimed aspects of the ingot production and forging steps. Neither the alloy nor the broad process would be effected -- e.g. if a beta phase stabilizer were added, then the forging temperature could be

changed, as long as it is took place in the alpha+beta phase field. Furthermore, Charquet teaches that his process relates to the production of a flat product (sheet) using a zirconium alloy with 0.5 – 2.0% Sn and with possible supplementary additions of niobium and vanadium. From these additional, one can surely envision the process being carried out on an alloy with more than 3% of additive elements.

Regarding claims 19-20, further specifying intended use does not patentably distinguish these claims over the teachings of Sabol. Sabol teaches that Zircaloy materials may be used as tubular cladding for fuel pellets **[claim 20],** and it is clear that these materials are used in nuclear reactors **[claim 19]**.

5. **Claim 17** is rejected under 35 U.S.C. 103(a) as being unpatentable over **Sabol** or **Charquet** as applied in 103 rejection above, in view of **Armand** (US 4,108,687).

What Charquet and Sabol taught was discussed in the 103 rejections to claim 6 above. Armand teaches thermo-mechanical treatment of Zircaloy 2 and 4 alloys to dissolve carbon in the alpha phase. Armand teaches a method of hot working these alloys by forging cast ingots in the alpha + beta range of 830-950 C (column 3, lines 10-13, 42-51).

Armand teaches a specific example (sequence 2, column 4, lines 35-41) with two forging (rolling) operations performed at 850 C (in the alpha+beta phase field) **[Claim 17]** and concludes that this process increased strength 7 – 20%, and yielded a lowered creep rate (column 5, lines 12-17) when compared to a dual alpha working process (sequence 1, column 4, lines 31-34).

Additionally, Armand warns that working above 950 C decreases the fraction of the alpha phase and hurts corrosion resistance (column 3, lines 16-21) and that working below 830 C the beta phase fraction is low, the alpha grains coarsen, and intermetallics coalesce and this leads to unfavorable mechanical properties (column 3, lines 21-28). Armand further teaches that additional hot working in the alpha phase (as a second forging step) can redistribute precipitates (away from grain boundaries) and affect a considerable improvement in corrosion resistance (column 3, lines 51-60).

Lastly, Armand teaches that this process could be applied to other zirconium-based alloys as long as they have a bi-phase alpha+beta range between 830 and 950 C. (column 5, lines 57-61).

It would have been obvious to one of ordinary skill in the metallurgical arts at the time the invention was made to combine Sobol in view of Armand to carry out a process of casting an ingot and then forging a zirconium alloy in the alpha+beta phase field twice as Sabol taught that ingots of zirconium alloy are normally forged in the alpha+beta phase field, among others,and then forged once again and Armand taught the advantages of forging a zirconium alloy in the alpha+beta region in terms of carbon dissolution, strength improvement, and higher creep resistance as compared to "classical" alpha forged produces. One would be motivated to combine Armand with Charquet for similar reasons given that Charquet discloses forging in a temperature range that includes the alpha+beta range.

Double Patenting

6. The nonstatutory double patenting rejection is based on a judicially created doctrine grounded in public policy (a policy reflected in the statute) so as to prevent the

unjustified or improper timewise extension of the "right to exclude" granted by a patent and to prevent possible harassment by multiple assignees. A nonstatutory obviousness-type double patenting rejection is appropriate where the conflicting claims are not identical, but at least one examined application claim is not patentably distinct from the reference claim(s) because the examined application claim is either anticipated by, or would have been obvious over, the reference claim(s). See, e.g., *In re Berg*, 140 F.3d 1428, 46 USPQ2d 1226 (Fed. Cir. 1998); *In re Goodman*, 11 F.3d 1046, 29 USPQ2d 2010 (Fed. Cir. 1993); *In re Longi*, 759 F.2d 887, 225 USPQ 645 (Fed. Cir. 1985); *In re Van Ornum*, 686 F.2d 937, 214 USPQ 761 (CCPA 1982); *In re Vogel*, 422 F.2d 438, 164 USPQ 619 (CCPA 1970); and *In re Thorington*, 418 F.2d 528, 163 USPQ 644 (CCPA 1969).

A timely filed terminal disclaimer in compliance with 37 CFR 1.321(c) or 1.321(d) may be used to overcome an actual or provisional rejection based on a nonstatutory double patenting ground provided the conflicting application or patent either is shown to be commonly owned with this application, or claims an invention made as a result of activities undertaken within the scope of a joint research agreement.

Effective January 1, 1994, a registered attorney or agent of record may sign a terminal disclaimer. A terminal disclaimer signed by the assignee must fully comply with 37 CFR 3.73(b).

7. **Claims 11-15, 19-20** are provisionally rejected on the ground of nonstatutory obviousness-type double patenting as being unpatentable over claims 6-9 of copending Application No. 10/541,262. Although the conflicting claims are not identical, they are not patentably distinct from each other because of the following reasons:

Regarding claim 11, copending application '262 discloses producing cast ingot with a diameter of 400-800 mm and the same length as the instant claim, however with only a single forming operation in the alpha+beta phase field to produce a given thickness. Moving from producing a flat sheet to making simply "elongated" products would be obvious to one of ordinary skill in the arts.

Regarding claim 12, claim 7 of the copending application is nearly identical.

Regarding claims 13-15, claim 8 of the copending application discloses a first forging operation in the alpha+beta phase field in a temperature range of 850 – 950 C.

Regarding claims 19 and 20, these claims are rejected as simply being drawn to intended use of the process of claim 11 as do not patentably distinguish themselves from the rejections applied to claim 11.

This is a provisional obviousness-type double patenting rejection because the conflicting claims have not in fact been patented.

Conclusion

1. Claims 11-20 are rejected
2. No claims are allowed

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Mark L. Shevin whose telephone number is (571) 270-3588. The examiner can normally be reached on Monday - Thursday, 8:30 AM - 5:00 PM EST.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Vickie Kim can be reached on (571) 272-0579. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see http://pair-direct.uspto.gov. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free). If you would like assistance from a USPTO Customer Service Representative or access to the automated information system, call 800-786-9199 (IN USA OR CANADA) or 571-272-1000.

Mark L Shevin
Examiner
Art Unit 4116

10-541,774

/Vickie Kim/
Supervisory Patent Examiner, Art Unit 4116